

CHAPTER 96

PRESSURE VESSELS

[Prior to 9/24/86, Labor, Bureau of[530] Ch 209]

[Prior to 1/14/98, see Labor Services[347] Ch 48]

[Prior to 8/16/06, see 875—Ch 209]

875—96.1(89) Codes adopted by reference. This rule applies to pressure vessels, except those exempted by Iowa Code section 89.4(2).

96.1(1) *Installations from July 1, 1983, to December 31, 1988.* Installations from July 1, 1983, to December 31, 1988, shall be designed, manufactured, installed, inspected, and stamped in conformity with the applicable sections of the ASME Boiler and Pressure Vessel Code (1983).

96.1(2) *Installations from January 1, 1989, to December 31, 1990.* Installations from January 1, 1989, to December 31, 1990, shall be designed, manufactured, installed, inspected, and stamped in conformity with the applicable sections of the ASME Boiler and Pressure Vessel Code (1986 with 1988 addenda).

96.1(3) *Installations from January 1, 1991, to June 30, 1996.* Installations from January 1, 1991, to June 30, 1996, shall be designed, manufactured, installed, inspected, and stamped in conformity with the applicable sections of the ASME Boiler and Pressure Vessel Code (1989 with 1990 addenda).

96.1(4) *Installations from July 1, 1996, to December 31, 1997.* Installations and reinstallations from July 1, 1996, to December 31, 1997, shall be designed, manufactured, installed, inspected, and stamped in accordance with the requirements of the ASME Code for Boilers and Pressure Vessels Section VIII (1995) or the requirements of recognized national or international standards such as DIN, BSI, ASME, JIS, or CSA. Only national and international standards acceptable to the division may be utilized.

96.1(5) *Installations from January 1, 1998, to December 31, 2000.* Installations and reinstallations from January 1, 1998, to December 31, 2000, shall be designed, manufactured, installed, inspected, and stamped in accordance with the requirements of the ASME Code for Boilers and Pressure Vessels Section VIII (1995) or the requirements of recognized national or international standards such as DIN, BSI, ASME, JIS, or CSA. Only national and international standards acceptable to the division may be utilized.

96.1(6) *Installations from January 1, 2001, to September 20, 2006.* Installations and reinstallations from January 1, 2001, to September 20, 2006, shall be designed, manufactured, installed, inspected, and stamped in accordance with the requirements of the ASME Code for Boilers and Pressure Vessels Section VIII (1998 with 1999 and 2000 addenda) or with the requirements of recognized national or international standards such as DIN, BSI, ASME, JIS, or CSA. Only national and international standards acceptable to the division may be utilized.

96.1(7) *Installations after September 20, 2006.* Installations and reinstallations after September 20, 2006, shall be designed, manufactured, installed, inspected, and stamped in accordance with the requirements of the ASME Code for Boilers and Pressure Vessels Section VIII (2004 with 2005 addenda) or with the requirements of recognized national or international standards such as DIN, BSI, ASME, JIS, or CSA. Only national and international standards acceptable to the division may be utilized.

875—96.2(89) Objects installed prior to July 1, 1983.

96.2(1) *Maximum allowable working pressure.*

a. The maximum allowable working pressure for code-stamped pressure vessels shall be determined in accordance with the applicable provisions of the ASME Code or American Petroleum Institute ASME Code under which they were constructed and stamped.

b. The maximum allowable working pressure on the shell of pressure vessels without a code stamp shall be determined by the following equation.

$\frac{TStE}{RFS}$ = Maximum allowable working pressure, psig.

Where:

- TS = Ultimate tensile strength of shell plate(s), psig. When the tensile strength of a steel plate(s) is unknown, it shall be taken as 55,000 psig for temperatures not exceeding 650 degrees F.
- t = Minimum thickness of shell plates of the weakest course, in inches.
- E = Efficiency of longitudinal joint. For riveted joints, use ASME Code, Section 1 (1971). For fusion-welded and brazed joints, use the following table:
- | | |
|------------------------------|----|
| Single lap welded. | 40 |
| Double lap welded | 60 |
| Single butt welded | 60 |
| Double butt welded | 75 |
| Forge welded. | 70 |
| Brazed steel. | 80 |
- R = Inside radius of the weakest course of shell or drum in inches, provided the thickness does not exceed 10 percent of the radius. If the thickness is over 10 percent of the radius, the outer radius shall be used.
- FS = Factor of safety shall be four.

c. The maximum allowable working pressure for noncode pressure vessels subjected to external or collapsing pressure shall be determined by the ASME Code, Section VIII, Divisions 1, 2 and 3 (1998 with 1999 and 2000 addenda).

96.2(2) Factor of safety. The inspector shall increase the factor of safety if the conditions and safety of the pressure vessel demand it.

96.2(3) End closures. The maximum allowable working pressure permitted for formed heads under pressure shall be determined by using the formulas in ASME Code, Section VIII, Divisions 1, 2 and 3 (1998 with 1999 and 2000 addenda).

96.2(4) Safety appliances. Each pressure vessel shall be protected by such safety and relief valves and indicating and controlling devices as will ensure its safe operation. Valves shall not readily be rendered inoperative. The relieving capacity of safety valves shall be such as to prevent a rise of pressure in the vessel of more than 10 percent above maximum allowable working pressure, taking into account the effect of static head. Safety valve discharges shall be carried to a safe place.

These rules are intended to implement Iowa Code chapter 89.

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